

Chapter 14. Verification Procedure, Warranty and In-Use Compliance Requirements for In-Use Strategies to Control Emissions from Diesel Engines

Amend Sections 2701, 2702, 2703, 2704, 2706, 2708, 2709, 2710, Title 13, California Code of Regulations, to read as follows:

Note: The pre-existing regulation text is set forth below in normal type. The amendments are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions.

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§ 2701. Definitions

- (a) The definitions in Section 1900(b), Chapter 1, Title 13 of the California Code of Regulations are incorporated by reference herein. The following definitions shall govern the provisions of this chapter:
- (1) "15 ppmw or less sulfur fuel" means diesel fuel with a sulfur content equal to or less than 15 parts per million by weight (ppmw).
 - (2) "Advertise" means to provide any notice, announcement, information, publication, catalog, listing for sale or lease, or other statement concerning a product or service communicated to the public for the purpose of furthering the sale or lease of the product or service.
 - ~~(2)~~ (3) "Alternative Diesel Fuel" means any fuel used in diesel engines that is not a reformulated diesel fuel as defined in Sections 2281 and 2282 of Title 13, of the California Code of Regulations, and does not require engine or fuel system modifications for the engine to operate, although minor modifications (e.g. recalibration of the engine fuel control) may enhance performance. Examples of alternative diesel fuels include, but are not limited to, biodiesel, Fischer Tropsch fuels, and emulsions of water in diesel fuel. Natural gas is not an alternative diesel fuel. An emission control strategy using a fuel additive will be treated as an alternative diesel fuel based strategy unless:
 - (A) The additive is supplied to the vehicle or engine fuel by an on-board dosing mechanism, or
 - (B) The additive is directly mixed into the base fuel inside the fuel tank of the vehicle or engine, or
 - (C) The additive and base fuel are not mixed until vehicle or engine fueling commences, and no more additive plus base fuel combination is mixed than required for a single fueling of a single engine or vehicle.
 - ~~(3)~~ (4) "Approach Light System with Sequenced Flasher Lights in Category 1 and Category 2 Configurations" (ALSF-1 and ALSF-2) mean high intensity approach lighting systems with sequenced flashers used at airports to illuminate specified runways during category II or III weather conditions, where category II means a decision height of 100 feet and runway visual range of 1,200 feet, and category III means no

decision height or decision height below 100 feet and runway visual range of 700 feet.

- ~~(4)~~ (5) "Applicant" means the entity that has applied for or has been granted verification under this Procedure.
- ~~(5)~~ (6) "Auxiliary Emission Control Device" (AECD) means any device or element of design that senses temperature, vehicle speed, engine revolutions per minute (RPM), transmission gear, manifold vacuum, or any other parameter for the purpose of activating, modulating, delaying, or deactivating the operation of the emission control system.
- ~~(6)~~ (7) "Average" means the arithmetic mean.
- ~~(7)~~ (8) "Backpressure Monitor" means a device that includes a sensor for measuring the engine backpressure upstream of a hardware-based diesel emission control system or component thereof installed in the exhaust system and an indicator to notify the operator when the backpressure exceeds specified high and in some cases low backpressure limits, as defined by the engine manufacturer or the applicant for verification of a diesel emission control strategy.
- ~~(8)~~ (9) "Baseline" means the test of a vehicle or engine without the diesel emission control strategy implemented.
- ~~(9)~~ (10) "Cold Start" means the start of an engine only after the engine oil and water temperatures are stabilized between 68 and 86 degrees Fahrenheit for a minimum of 15 minutes.
- ~~(10)~~ (11) "Diesel emission control strategy" or "Diesel emission control system" means any device, system, or strategy employed with an in-use diesel vehicle or piece of equipment that is intended to reduce emissions. Examples of diesel emission control strategies include, but are not limited to, particulate filters, diesel oxidation catalysts, selective catalytic reduction systems, fuel additives used in combination with particulate filters, alternative diesel fuels, and combinations of the above.
- ~~(11)~~ (12) "Diesel Emission Control Strategy Family Name." See Section 2706~~(g)~~ (h) (2).
- ~~(12)~~ (13) "Diesel Engine" means an internal combustion engine with operating characteristics significantly similar to the theoretical diesel combustion cycle. The primary means of controlling power output in a diesel cycle engine is by limiting the amount of fuel that is injected into the combustion chambers of the engine. A diesel cycle engine may be petroleum-fueled (i.e., diesel-fueled) or alternate-fueled.
- (14) "Distributor" means any person or entity to whom a diesel emission control strategy is sold, leased or supplied for the purposes of resale or distribution in commerce.
- ~~(13)~~ (15) "Durability" means the ability of the applicant's diesel emission control strategy to maintain a level of emissions below the baseline and maintain its physical integrity over some period of time or

distance determined by the Executive Officer pursuant to these regulations. The minimum durability testing periods contained herein are not necessarily meant to represent the entire useful life of the diesel emission control strategy in actual service.

- ~~(14)~~ (16) "Emergency Standby Engine" means a diesel engine operated solely for emergency use, except as otherwise provided in airborne toxic control measures adopted by the ARB.
- ~~(15)~~ (17) "Emergency Use" means using a diesel engine to provide electrical power or mechanical work during any of the following events and subject to the following conditions:
 - (A) The failure or loss of all or part of normal electrical power service or normal natural gas supply to the facility,
 - (B) The failure of a facility's internal power distribution system,
 - (C) The pumping of flood water or sewage to prevent or mitigate a flood or sewage overflow,
 - (D) The pumping of water for fire suppression or protection,
 - (E) The powering of ALSF-1 and ALSF-2 airport runway lights under category II or III weather conditions,
 - (F) Other conditions as specified in airborne toxic control measures adopted by the ARB.
- ~~(16)~~ (18) "Emission control group" means a set of diesel engines and applications determined by parameters that affect the performance of a particular diesel emission control strategy. The exact parameters depend on the nature of the diesel emission control strategy and may include, but are not limited to, certification levels of engine emissions, combustion cycle, displacement, aspiration, horsepower rating, duty cycle, exhaust temperature profile, and fuel composition. Verification of a diesel emission control strategy and the extension of existing verifications are done on the basis of emission control groups.
- (19) "End user" means any individual or entity that owns or operates a vehicle or piece of equipment that has a verified diesel emission control system installed.
- ~~(17)~~ (20) "Executive Officer" means the Executive Officer of the Air Resources Board or the Executive Officer's designee.
- ~~(18)~~ (21) "Executive Order" means the document signed by the Executive Officer that specifies the verification level of a diesel emission control strategy for an emission control group and includes any enforceable conditions and requirements necessary to support the designated verification.
- ~~(19)~~ (22) "Fuel Additive" means any substance designed to be added to fuel or fuel systems or other engine-related systems such that it is present in-cylinder during combustion and has any of the following effects: decreased emissions, improved fuel economy, increased performance of the entire vehicle or one of its component parts, or any combination thereof; or assists diesel emission control

strategies in decreasing emissions, or improving fuel economy or increasing performance of a vehicle or component part, or any combination thereof. Fuel additives used in conjunction with diesel fuel may be treated as an alternative diesel fuel. See Section 2701(a)(2) (3) .

~~(20)~~ (23) "Hot Start" means the start of an engine within four hours after the engine is last turned off. The first hot start test run should be initiated 20 minutes after the cold start for Federal Test Procedure testing following Section 86.1327-90 of the Code of Federal Regulations, Title 40, Part 86.

(24) "Installer" means any individual or entity that equips any vehicle, engine or equipment with a diesel emission control strategy.

~~(21)~~ (25) "Portable Engine" means an engine designed and capable of being carried or moved from one location to another, except as defined in Section 2701(a)(24) ~~(29)~~. Engines used to propel mobile equipment or a motor vehicle of any kind are not portable. Indicators of portability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform. A portable engine cannot remain at the same facility location for more than 12 consecutive rolling months or 365 rolling days, whichever occurs first, not including time spent in a storage facility. If it does remain at the facility for more than 12 months, it is considered to be a stationary engine. The definitions in Title 13 California Code of Regulations Section 2452(g) and Section 2452(x) are incorporated by reference herein.

~~(22)~~ (26) "Regeneration", in the context of diesel particulate filters, means the periodic or continuous combustion of collected particulate matter that is trapped in a particulate filter through an active or passive mechanism. Active regeneration requires a source of heat other than the exhaust itself to regenerate the particulate filter. Examples of active regeneration strategies include, but are not limited to, the use of fuel burners and electrical heaters. Passive regeneration does not require a source of heat for regeneration other than the exhaust stream itself. Examples of passive regeneration strategies include, but are not limited to, the use of fuel additives and the catalyst-coated particulate filter. In the context of NOx reduction strategies, "regeneration" means the desorption and reduction of NOx from NOx adsorbers (or NOx traps) during rich operation conditions.

~~(23)~~ (27) "Revoke" means to cancel the verification status of a diesel emission control strategy. If a diesel emission control strategy's verification status is revoked by the Executive Officer, the applicant must immediately cease and desist selling the diesel emission control strategy to end-users.

(28) "Seller" means any person or entity that sells, leases or supplies a diesel emission control strategy.

- ~~(24)~~ (29) "Stationary Engine" means an engine that is designed to stay in one location, or remains in one location. An engine is stationary if any of the following are true:
- (A) The engine or its replacement is attached to a foundation, or if not so attached, will reside at the same location for more than 12 consecutive months. Any engine that replaces engine(s) at a location, and is intended to perform the same or similar function as the engine(s) being replaced, will be included in calculating the consecutive time period. In that case, the cumulative time of all engine(s), including the time between the removal of the original engine(s) and installation of the replacement engine(s), will be counted toward the consecutive time period; or
 - (B) The engine remains or will reside at a location for less than 12 consecutive months if the engine is located at a seasonal source and operates during the full annual operating period of the seasonal source, where a seasonal source is a stationary source that remains in a single location on a permanent basis (at least two years) and that operates at that single location at least three months each year; or
 - (C) The engine is moved from one location to another in an attempt to circumvent the residence time requirements [Note: The period during which the engine is maintained at a storage facility shall be excluded from the residency time determination.] The definitions in Title 13 California Code of Regulations Section 2452(g) and Section 2452(x) are incorporated by reference herein.
- ~~(25)~~ (30) "Verification" means a determination by the Executive Officer that a diesel emission control strategy meets the requirements of this Procedure. This determination is based on both data submitted or otherwise known to the Executive Officer and engineering judgement.
- (31) "Warrantable condition" means any condition of the diesel emission control strategy, vehicle, or engine which triggers the responsibility of the applicant to take corrective action pursuant to Section 2707.

NOTE: Authority cited: Sections 39002, 39003, 39500, 39600, 39601, 39650-39675, 40000, 43000, 43000.5, 43011, 43013, 43018 and 43105, 43600, 43700, Health and Safety Code. Reference: Sections 39650-39675, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107, and 43204-43205.5 Health and Safety Code; Title 17 California Code of Regulations Section 93000.

§ 2702. Application Process

- (a) Overview. Before submitting a final ~~formal~~ application for the verification of a diesel emission control strategy for use with an emission control group, the

applicant must submit a ~~proposed verification testing protocol~~ preliminary verification application (pursuant to Section 2702(b)) at the Executive Officer's discretion in the format shown in 2702(d). To obtain verification, the applicant must conduct emission reduction testing (pursuant to Section 2703), durability testing (pursuant to Section 2704), a field demonstration (pursuant to Section 2705), and submit the results along with comments and other information (pursuant to Sections 2706 and 2707) in a final verification application to the Executive Officer, in the format shown in Section 2702(d). If the Executive Officer grants verification of a diesel emission control strategy, it will issue an Executive Order to the applicant identifying the verified emission reduction and any conditions that must be met for the diesel emission control strategy to function properly. After the Executive Officer grants verification of a diesel emission control strategy, the applicant must provide a warranty, conduct in-use compliance testing of the strategy after having sold or leased a specified number of units, and report the results to the Executive Officer (pursuant to Section 2709). A diesel emission control strategy that employs two or more individual systems or components must be tested and submitted for evaluation as one system. Applicants seeking verification of an alternative diesel fuel must follow the procedure described in Section 2710.

(b) ~~Proposed Verification Testing Protocol~~ Preliminary Verification Application.

Before formally submitting an final application for the ~~initial~~ verification of a diesel emission control strategy, the applicant must submit a ~~proposed verification testing protocol~~ preliminary verification application at the Executive Officer's discretion. The Executive Officer shall use the information in the ~~proposed protocol~~ preliminary verification application to help determine whether the strategy relies on sound principles of science and engineering to control emissions, the need for additional analyses, and the appropriateness of allowing alternatives to the prescribed requirements. The ~~protocol~~ preliminary verification application must follow the format shown in Section 2702(d) and at a minimum provide the information required in sections 1 through 5 and section 8.A.A.5, where applicable. In addition, the preliminary verification application must ~~should~~ include the following information:

- (1) Identification of the contact persons, phone numbers, names and addresses of the responsible party ~~proposing to submitting the preliminary verification an~~ application.
- (2) Description of the diesel emission control strategy's principles of operation. A schematic depicting operation ~~should~~ must be included ~~as appropriate~~. It is the responsibility of the applicant to demonstrate that its product relies on sound principles of science and engineering to achieve emission reductions.
 - (A) If, after reviewing the ~~proposed protocol~~ preliminary verification application, the Executive Officer determines that the applicant has not made a satisfactory demonstration that its product (diesel emission control strategy) relies on sound principles of science

and engineering to achieve emission reductions, the Executive Officer shall notify the applicant of the determination in writing within 30 days of receiving the preliminary verification application. The applicant may choose to withdraw from the verification process or submit additional materials and clarifications. The additional submittal must be received by the Executive Officer no later than 60 days from the date of the notification letter or the application may be suspended.

- (B) If, after reviewing the additional submittal, the Executive Officer determines that the applicant has not yet made a satisfactory demonstration that its product relies on sound principals of science and engineering to achieve emission reductions, the preliminary verification application shall be suspended. If an preliminary verification application has been suspended, it may only be reactivated at the discretion of the Executive Officer.
 - (C) If at any time, the Executive Officer has reason to doubt the scientific or engineering soundness of a product, the Executive Officer may require the applicant to submit additional supporting materials and clarifications no later than 60 days from the date of the notification letter. If the additional submittal is not received by the Executive Officer by the deadline established in the notification letter, the preliminary or final application may be suspended or the existing verification may be revoked. In deciding whether to suspend an preliminary or final application or revoke an existing verification the Executive Officer will review submittals as provided in subsection (B) above.
- (3) Preliminary parameters for defining emission control groups that are appropriate for the diesel emission control strategy. The Executive Officer will work with the applicant to determine appropriate emission control group parameters.
 - (4) The applicant's proposed test plan for meeting the requirements of Sections 2702-2706. Existing test data may be submitted for the Executive Officer's consideration. The ~~protocol~~ preliminary verification application must focus on verification of the diesel emission control strategy for use with a single emission control group.
 - (5) A brief statement that the applicant acknowledges and agrees to do the following:
 - (A) Provide a warranty pursuant to the requirements of Section 2707
 - (B) Submit in-use compliance information pursuant to the requirements of Section 2709
 - (C) Keep records until the in use compliance requirements are completed that contain information per Section 2702 (m) including:
 - 1. Updated end user contact information

2. A description of the vehicles or equipment on which the applicant's products are installed
3. A description of the engines on which the applicant's products are installed

(c) If When an applicant submits a ~~proposed verification testing protocol~~ preliminary verification application, the Executive Officer shall, within 30 days of its receipt, determine whether the applicant has identified an appropriate testing protocol to support an application for verification and notify the applicant in writing that it may submit an application for verification. The Executive Officer may suggest modifications to the proposed verification testing protocol to facilitate verification of the diesel emission control strategy. All applications, correspondence, and reports must be submitted in writing to:

Chief, Heavy-Duty Diesel In-Use Strategies Branch
 Air Resources Board
~~9528 Tolstar Avenue~~
~~El Monte, CA 91731~~
1001 I Street
Sacramento, CA 95814

(d) Application Format. The preliminary and final verification applications must be submitted in writing to the address shown in subsection (c) above. Electronic mail and verbal submissions do not constitute acceptable application formats. Supporting data in electronic format may be accepted as part of the application at the discretion of the Executive Officer. The preliminary and final verification applications for verification of a diesel emission control strategy must follow the format shown below. If a section asks for information that is not applicable to the diesel emission control strategy, the applicant must indicate "not applicable." If the Executive Officer concurs with the applicant's judgement that a section is not applicable, the Executive Officer may waive the requirement to provide the information requested in that section. Final verification applications must include all of the information provided in the preliminary verification application as described in Section 2702(b), including any additional information, updates, or changes, and all additional information shown below.

1. Introduction

- 1.1 Identification of applicant, manufacturer, and product
- 1.2 Identification of type of verification being sought
 - 1.2.1 Description of emission control group selected
 - 1.2.2 Emission reduction claim
 - 1.2.3 Description of intended applications (examples of in-use vehicles or equipment, typical duty cycles, fuel requirements, etc.)

2. Diesel Emission Control Strategy Information

- 2.1 General description of the diesel emission control strategy
 - 2.1.1 Detailed Discussion of principles of operation and system design
 - 2.1.2 Schematics depicting operation (as appropriate)
 - 2.1.3 A list identifying all the parts of the diesel emission control strategy
- 2.2 Description of regeneration method
 - 2.2.1 Operating condition requirements for regeneration
 - 2.2.2 Thresholds and control logic to activate regeneration
 - 2.2.3 Description of backpressure monitor including thresholds and control logic
- 2.3 Favorable operating conditions
- 2.4 Unfavorable operating conditions and associated reductions in performance
- 2.5 Fuel and lubricating oil requirements and misfueling considerations
- 2.6 Identification of failure modes and associated consequences
- 2.7 Complete discussion of potential safety issues (*e.g., uncontrolled regeneration, lack of proper maintenance, unfavorable operating conditions, etc.*)
- 2.8 Installation requirements
- 2.9 Maintenance requirements
- 2.10 Description of noise level control compliance

3. Alternative Diesel Fuel and Fuel Additive Information

(Use of an alternative diesel fuel/fuel additive requires a multimedia evaluation as required by Section 43830.8 California Health and Safety Code)

- 3.1 Additional Information from Section 2710(b), 2710(c), 2710(f), and 2710(g)
- 3.2 Emission control group compatibility considerations
- 3.3 Misfueling prevention strategies
- 3.4 Multimedia Evaluation
 - 3.4.1 Additional test data and information required for multimedia evaluation

4. Diesel Emission Control Strategy and Emission Control Group Compatibility

- 4.1 Compatibility with the engine
 - 4.1.1 Discussion on calibrations and design features that may vary from engine to engine
 - 4.1.2 Effect on overall engine performance
 - 4.1.3 Effect on engine backpressure
 - 4.1.4 Additional load on the engine
 - 4.1.5 Effect on fuel consumption
 - 4.1.6 Engine oil consumption considerations
- 4.2 Compatibility with the application
 - 4.2.1 Dependence of calibration and other design features on application characteristics

- 4.2.2 Presentation of typical exhaust temperature profiles and other relevant field-collected data from representative applications within the emission control group
- 4.2.3 Comparison of field-collected application data with operating conditions suitable for the diesel emission control strategy
- 4.3 Maintenance Requirements
 - 4.3.1 Detailed description of all normal maintenance requirements for the diesel emission control system
 - 4.3.2 A copy of the language that will instruct the end user of proper handling of spent components and/or materials cleaned from the diesel emission control system, identify any hazardous materials, and provide procedures for resetting any backpressure monitors after maintenance procedures are completed.

5. Testing Information

- 5.1 Emission reduction testing
 - 5.1.1 Test facility identification
 - 5.1.2 Description of test vehicle and engine (*make, model year, engine family name, PM and NOx certification levels if applicable, etc.*)
 - 5.1.3 Statement indicating whether the test engine is in a proper state of maintenance, and/or has been rebuilt or modified from the original engine manufacturer configuration
 - 5.1.4 Description of test fuel
 - 5.1.5 Discussion of effects of elevated NOx emissions on diesel emission control strategy (effects on emission reduction performance, durability, safety, and control strategy response)
 - 5.1.6 Test procedure description (-pre-conditioning period, test cycle, etc.)
 - 5.1.7 Test results and comments
 - 5.1.8 Incomplete and aborted test data and explanations
- 5.2 Durability testing
 - 5.2.1 Test facility identification
 - 5.2.2 Description of field application (where applicable)
 - 5.2.3 Description of test vehicle and engine (*make, model year, engine family name, PM and NOx certification levels if applicable, etc.*)
 - 5.2.4 Analysis of emissions test fuel
 - 5.2.5 Analysis of durability test fuel
 - 5.2.6 Test procedure description (field or bench, test cycle, etc.)
 - 5.2.7 Description of maintenance during durability testing
 - 5.2.8 Test results and comments
 - 5.2.9 Summary of evaluative comments from third-party for in-field durability demonstration (e.g., driver or fleet operator)
- 5.3 Field demonstration (where applicable)
 - 5.3.1 Field application identification
 - 5.3.2 Description of test vehicle and engine (*make, model year, engine family name, PM and NOx certification levels if applicable, etc.*)

- 5.3.3 Engine backpressure and exhaust temperature graphs with comments
- 5.3.4 Summary of evaluative comments from third-party (*e.g., driver or fleet operator*)
- 5.3.5 Description of test failures

6. Warranty and In-Use Compliance Requirements

- 6.1 Statement that the applicant agrees to provide annual warranty reports and to follow the warranty requirements per Section 2707
- 6.2 Statement that the applicant agrees to follow the in-use compliance requirements per Section 2709
- 6.3 Statement that the applicant agrees to keep the required end user information per Section 2702(m)

6. 7. References

7. 8. Appendices

- A. Laboratory test report information (*for all tests, including incomplete, aborted and failed tests*)
 - A.1 Actual laboratory test data
 - A.2 Plots of engine backpressure and exhaust temperature
 - A.3 Driving traces for chassis dynamometer tests
 - A.4 Quality assurance and quality control information
 - A.5 Testing equipment information and indication that testing equipment meets specifications and calibrations given in the Code of Federal Regulations, Title 40, Part 86 (See Sections 2703(m), 2706(a)(2))
- B. Third-party letters or questionnaires describing in-field performance
- C. Diesel emission control system label
- D. Copy of the Owner's manual (as described in Section 2706 (i) (ii))
- E. Sample diesel emission control system label (See Section 2706(h))
- F. Other supporting documentation

- (e) Within 30 days of receipt of the application, the Executive Officer shall notify the applicant whether the application is complete.

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- (h) Conditional Extensions of an Existing Verification for On-road Applications. If an applicant has an ARB verified diesel emission control strategy and wishes to extend the verification to include new on-road emission control groups, the applicant may apply to receive a conditional extension. If the Executive Officer determines that the diesel emission control strategy is technologically

sound and appropriate for the intended application, the applicant may be granted a conditional extension for up to one year. Upon receiving a conditional extension, the applicant may sell the diesel emission control strategy as a verified product for the duration of the conditional extension period. To obtain full verification, the applicant must complete the requirements set forth by the Executive Officer. In granting a conditional extension, the Executive Officer may consider all relevant information including, but not limited to, the following: the design of the diesel emission control strategy, original test data, other relevant test data, the duty cycle of the prospective emission control group, and field experience. For the time period it is effective, a conditional extension is equivalent to a verification for the purposes of satisfying the in-use compliance requirements. Emission control strategies that are conditionally verified for off-road and stationary applications are not eligible for conditional extensions (See Section 2704(i)).

- (h) (i) Design Modifications. If an applicant modifies the design of a diesel emission control strategy that has already been verified or is under consideration for verification by the Executive Officer, the modified version must be evaluated under this Procedure. The applicant must provide a detailed description of the design modification along with an explanation of how the modification will change the operation and performance of the diesel emission control strategy. To support its claims, the applicant must submit additional test data, engineering justification and analysis, or any other information deemed necessary by the Executive Officer to address the differences between the modified and original designs. Processing time periods follow sections (e) and (f) above.
- (j) Verification Transfers. If an applicant wishes to sell, lease, or supply another applicant's previously verified diesel emission control system, the applicant must do the following:
- (1) Submit a letter of consent from the applicant that legally holds the original verification. The letter must give the applicant the right to hold a verification for the diesel emission control system and, if applicable, to use information that was previously submitted as support in the application for the original verification.
 - (2) Submit an application(s) per Section 2702 of this Procedure. If previously submitted information is included, necessary additional information must be submitted that satisfies all applicable requirements of this Procedure (e.g. testing data, warranty statement, label, owner's manual, etc.).
 - (3) Submit a description of the diesel emission control strategy's principles of operation. The applicant must demonstrate understanding of how the product relies on sound principles of science and engineering to achieve emissions reductions.
- (k) Emission Control Systems Approved under Other Verification Programs. Any applicant with a diesel emission control system that is verified under another

diesel emission control verification program that wishes to receive ARB verification must submit an application that contains the information requested in part (d) above. Pre-existing data and information submitted in support of verification approval from other programs may be submitted, but the applicant must meet requirements that are unique to this Procedure including, but not limited to, a system label compliant with Section 2706(h), a California owner's manual compliant with Section 2706(i), a warranty compliant with Section 2707, in-use compliance requirements per Section 2709, and multimedia evaluation if applicable. The Executive Officer may evaluate all information submitted including additional information required by this Procedure to determine if a diesel emission control strategy merits ARB verification.

- (j) (l) Treatment of Confidential Information. Information submitted to the Executive Officer by an applicant may be claimed as confidential, and such information shall be handled in accordance with the procedures specified in Title 17, California Code of Regulations, Sections 91000-91022. The Executive Officer may consider such confidential information in reaching a decision on a verification application.
- (m) Applicants that receive verifications, conditional verifications, or conditional extensions must keep records that have valid end user contact information (name, address, phone number), a description of the vehicles or equipment the units are applied to (make, model, model year, vehicle identification number), and a description of the engines the units are applied to (make, model, model year, engine serial number, engine family name). The applicant must keep these records until the in-use compliance requirements are completed. Applicants that receive conditional extensions or conditional verifications must submit these records to the Executive Officer one year after receiving the conditional extension or conditional verification. Applicants that receive verifications must submit these records upon request by the Executive Officer. The Executive Officer may request that such records be made available at any time. The applicant must provide these records within 30 days of the request by the ARB. Failure to submit these records may result in revocation or suspension of the verification and/or any other remedy available under Part 5, Division 26 of the Health and Safety Code.
- (n) The Executive Officer may, with respect to any diesel emission control strategy sold, leased, offered for sale, or manufactured for sale in California, order the applicant or strategy manufacturer to make available for testing and/or inspection a reasonable number of diesel emission control systems, and may direct that they be delivered at the applicant's expense to the state board at the Haagen-Smit Laboratory, 9528 Telstar Avenue, El Monte, California or where specified by the Executive Officer. The Executive Officer may also, with respect to any diesel emission control strategy being sold, leased, offered for sale, or manufactured for sale in California, have an

applicant test and/or inspect under the supervision of the Executive Officer a reasonable number of units at the applicant's or manufacturer's facility or at any test laboratory accepted by the Executive Officer.

- (j) (o) The Executive Officer may lower the verification level or revoke the verification status of a verified diesel emission control strategy family, a conditionally verified system, or a conditionally extended system if the Executive Officer determines there are errors, omissions, or inaccurate information, or fraudulent submittals in the application for verification, or supporting information, warranty report, or in-use compliance testing. Additionally, penalties may be assessed under Part 5, Division 26 of the Health and Safety Code. The Executive Officer may also seek remedial action against the applicant if it is determined that the verified diesel emission control strategies do not comply with the requirements or provisions of the Executive Order.

NOTE: Authority cited: Sections 39002, 39003, 39500, 39600, 39601, 39650-39675, 40000, 43000, 43000.5, 43011, 43013, 43018 and 43105, 43600, 43700, Health and Safety Code. Reference: Sections 39650-39675, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107, and 43204-43205.5 Health and Safety Code; Title 17 California Code of Regulations Section 93000.

§ 2703. Emission Testing Requirements.

* * * *

(d) Test Fuel.

(1) The test fuel must meet the specifications in the California Code of Regulations (Sections 2280 through 2283 of Title 13), with the exception of the sulfur content or other properties previously identified by the applicant and approved by the Executive Officer. The Executive Officer may approve test fuel(s) that do not comply with Sections 2280 through 2283 of Title 13 of the California Code of Regulations if the fuel(s) are determined to be , based on sound science and engineering, representative of commercially available fuel typically used for the intended application(s).

- (e) Test Cycle. The diesel emission control strategy must be tested using the test cycles indicated in subparagraphs 1-3 below (summarized in Table 2) or with an alternative cycle(s) approved by the Executive Officer pursuant to subsection (f) below.

Table 2. Test Cycles for Emission Reduction Testing*

Test Type	On-Road	Off-Road (including portable engines)	Stationary
Engine	FTP Heavy-duty Transient Cycle (1 cold-start and 3 hot-starts)	Steady-state test cycle from ARB off-road regulations (3 hot-starts)	Steady-state test cycle from ARB off-road regulations (3 hot-starts)
Chassis	UDDS (3 hot-starts) and a low-speed test cycle per 2703 (e)(1)(B)(ii) <u>2</u> . (3 hot-starts).	Not Applicable	Not Applicable

* Additional hot-starts are required for NO_x emission reductions between 15 to 25 percent (see Section 2703(h)).

FTP = Federal Test Procedure; UDDS = Urban Dynamometer Driving Schedule

- (1) On-road Engines and Vehicles. For on-road diesel-fueled vehicles, the applicant may choose between engine dynamometer testing and chassis dynamometer testing, subject to the following conditions. Engine testing may be used for verification of an absolute engine emissions level or a percent emission reduction. Chassis testing may be used only to verify a percent emission reduction. The applicant may use emission test data to satisfy the durability test data requirement, but must follow the same testing option for the remaining durability tests (see Section 2704).
- (A) Engine testing must consist of one cold-start and at least three hot-start tests using the Federal Test Procedure (FTP) Heavy-duty Transient Cycle for engines used in on-road applications, in accordance with the provisions in the Code of Federal Regulations, Title 40, Part 86, Subpart N.
- (B) The applicant must conduct all chassis tests in accordance with the provisions of the Code of Federal Regulations, Title 40, Part 86, Subpart N insofar as they pertain to chassis dynamometer testing. Chassis testing must include two separate test cycles as follows:
1. At least three hot-start tests using the Urban Dynamometer Driving Schedule (UDDS) (see Code of Federal Regulations, Title 40, Part 86, appendix I (d)).

* * * * *

3. The driver must follow the test cycles as closely as possible and must not deviate beyond the following tolerances (See Code of Federal Regulation, Part 86, Subpart M, 86.1215-85).
 - (i) a. The upper limit is 4 miles per hour higher than the highest point on the trace within 1 second of the given time.
 - (ii) b. The lower limit is 4 miles per hour lower than the lowest point on the trace within 1 second of the given time.
 - (iii) c. Speed variations greater than the tolerances (such as may occur during gear changes or braking spikes) are acceptable, provided they occur for less than 2 seconds on any occasion and are clearly documented as to the time and speed at that point of the test cycle.
 - (iv) d. Speeds lower than those prescribed are acceptable, provided the vehicle is operated at maximum available power during such occurrences.

* * * * *

(m) Quality Control of Test Data. The applicant must provide information on the test facility, test procedure, and equipment used in the emission testing. For data gathered using on-road and off-road test cycles and methods, applicants must provide evidence establishing that the test equipment used meets the specifications and calibrations given in the Code of Federal Regulations, Title 40, Part 86, subpart N. The testing information must be approved by the Executive Officer.

~~(n) The Executive Officer may, with respect to any diesel emission control strategy sold, leased, offered for sale, or manufactured for sale in California, order the applicant or strategy manufacturer to make available for testing and/or inspection a reasonable number of diesel emission control systems, and may direct that they be delivered at the applicant's expense to the state board at the Haagen-Smit Laboratory, 9528 Tolstar Avenue, El Monte, California or where specified by the Executive Officer. The Executive Officer may also, with respect to any diesel emission control strategy being sold, leased, offered for sale, or manufactured for sale in California, have an applicant test and/or inspect a reasonable number of units at the applicant or manufacturer's facility or at any test laboratory under the supervision of the Executive Officer.~~

NOTE: Authority cited: Sections 39002, 39003, 39500, 39600, 39601, 39650-39675, 40000, 43000, 43000.5, 43011, 43013, 43018 and 43105, 43600, 43700, Health and Safety Code. Reference: Sections 39650-39675, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107, and 43204-43205.5 Health and Safety Code; Title 17 California Code of Regulations Section 93000.

§ 2704. Durability Testing Requirements

* * * * *

(c) Test Fuel.

- (1) The test fuel must meet the specifications in the California Code of Regulations (Sections 2280 through 2283 of Title 13), with the exception of the sulfur content or other properties previously identified by the applicant and approved by the Executive Officer. The Executive Officer may approve test fuel(s) that do not comply with Sections 2280 through 2283 of Title 13 of the California Code of Regulations if the fuel(s) are determined to be, based on sound science and engineering, representative of commercially available fuel typically used for the intended application(s).

* * * * *

- (d) Service Accumulation. The durability demonstration consists of an extended service accumulation period in which the diesel emission control strategy is implemented in the field or in a laboratory accepted by the Executive Officer, with emission reduction testing before and after the service accumulation. Service accumulation begins after the first emission test and concludes before the final emission test. The pre-conditioning period required in Section 2703 (c) cannot be used to meet the service accumulation requirements.

* * * * *

NOTE: Authority cited: Sections 39002, 39003, 39500, 39600, 39601, 39650-39675, 40000, 43000, 43000.5, 43011, 43013, 43018 and 43105, 43600, 43700, Health and Safety Code. Reference: Sections 39650-39675, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107, and 43204-43205.5 Health and Safety Code; Title 17 California Code of Regulations Section 93000.

§ 2706. Other Requirements.

* * * * *

- (c) Fuel Additives. Diesel emission control strategies that use fuel additives must comply with Section 2710 and meet the following additional requirements for verification. Fuel additives must be used in combination with a level 3 diesel particulate filter unless they can be proven to the satisfaction of the Executive Officer to be safe for use alone. In addition, the applicant must meet the following requirements:
 - (1) The applicant must submit the exact chemical formulation of the fuel additive,

* * * * *

- (d) Alternative Diesel Fuels. Alternative diesel fuels must be in compliance with applicable federal, state, and local government requirements. This requirement includes, but is not limited to registration of the alternative diesel fuel with the U.S. EPA. The applicant must conduct additional emission tests of alternative diesel fuels if the Executive Officer determines that such tests are necessary. The Executive Officer may consider all factors including, but not limited to, fuel components that could adversely affect emissions reductions and/or the applications to which they are applied.
- ~~(d)~~ (e) Engine Backpressure and Monitoring. During the emission and durability testing, the applicant must demonstrate that the backpressure caused by its diesel emission control system is within the engine manufacturer's specified limits, or will not result in any damage to the engine. Furthermore,
- (1) If operation of the engine with the diesel emission control system installed will result in a gradual build-up of backpressure exceeding the engine's specified limits over time (such as due to the accumulation of ash in a filter), information describing how the backpressure will be reduced must be included.
 - (2) All filter-based diesel emission control systems must be installed with a backpressure monitor to notify the operator when the high backpressure limit, as specified by the engine manufacturer or included in the verification, is approached. The applicant must identify the high backpressure limits of the system in its application for verification.
 - (3) The Executive Officer reserves the right to require monitors that identify low backpressure limits in those cases where failures leading to low backpressure are unlikely to be detected, or have the potential to cause environmental damage beyond that caused by the engine prior to being equipped with the emission control strategy (e.g., systems that introduce additives into the fuel).
- ~~(e)~~ (f) Fuel and Oil Requirements. The applicant must specify the fuel and lubricating oil requirements necessary for proper functioning of the diesel emission control system. The applicant must also specify any consequences that will be caused by failure to comply with these requirements, as well as methods for reversing any negative consequences.
- ~~(f)~~ (g) Maintenance Requirements. The applicant must identify all normal maintenance requirements for the diesel emission control system. The applicant must specify the recommended intervals for cleaning and/or replacing components. Any components to be replaced within the defects warranty period must be covered with the original diesel emission control system package or provided free of charge to the customer at the

appropriate maintenance intervals. Any normal maintenance items that the applicant does not intend to provide free of charge must be approved by the Executive Officer (the applicant is not required to submit cost information for these items). In addition, the applicant must specify procedures for proper handling of spent components and/or materials cleaned from the diesel emission control system. If any such materials are hazardous, the applicant must identify them as such in the owner's manual. For filter-based diesel emission control strategies, the applicant must include procedures for resetting any backpressure monitors after maintenance procedures are completed.

~~(g)~~ (h) System Labeling.

(1) The applicant must ensure that ~~a legible and durable label is identical, legible, and durable labels are~~ affixed on both the diesel emission control system and the engine on which the diesel emission control system is installed except as noted in (3) below. The required labels must identify the name, address, and phone number of the manufacturer, the diesel emission control strategy family name (defined in (2) below), a unique serial number, and the month and year of manufacture. The month and year of manufacture are not required on the label if this information can be readily obtained from the applicant by reference to the serial number. A scale drawing of a sample label must be submitted with the verification application. Unless an alternative is approved by the Executive Officer, the label information must be in the following format:

Name, Address, and Phone Number of Manufacturer

Diesel Emission Control Strategy Family Name

Product Serial Number

ZZ-ZZ (Month and Year of manufacture, e.g., 06-02)

(2) Diesel Emission Control Strategy Family Name. Each diesel emission control strategy shall be assigned a family name defined as below:

CA/MMM/YYYY/PM#/N##/APP/XXXXX

CA: Designates a diesel emission control strategy verified in California

MMM: Manufacturer code (assigned by the Executive Officer)

YYYY: Year of verification

PM#: PM verification level 1, 1+, 2, 2+, 3, or 3+ (e.g., PM3 means a level 3 PM emission control system).

N##: NOx verified reduction level in percent, if any (e.g., N25 means NOx reduction of 25 percent).

APP: Verified application which may include a combination of On-road (ON), Off-road (OF), or Stationary (ST)

XXXXX: Five alphanumeric character code issued by the Executive

Officer

- (3) The applicant may request that the Executive Officer approve an alternative format or waive the requirement to affix a label to the diesel emission control system or engine as described in this section. In reviewing this request, the Executive Officer may consider all relevant information including, but not limited to, the informational content of an alternative label as proposed by the applicant.
- ~~(h)~~ (i) Additional Information. The Executive Officer may require the applicant to provide additional information about the diesel emission control strategy or its implementation when such information is needed to assess environmental impacts associated with its use.
- ~~(h)~~ (j) Owner's Manual. The applicant must provide a copy of the diesel emission control system owner's manual, which must clearly specify at least the following information:
- (1) Warranty statement including the warranty period over which the applicant is liable for any defects.
 - (2) Installation procedure and maintenance requirements for the diesel emission control system.
 - (3) Possible backpressure range imposed on the engine.
 - (4) Fuel consumption penalty, if any.
 - (5) Fuel requirements including sulfur limit, if any.
 - (6) Handling and supply of additives, if any.
 - (7) Instructions for reading and resetting the backpressure monitor.
 - (8) Requirements for lubrication oil quality and maximum lubrication oil consumption rate.
 - (9) Contact information for replacement components and cleaning agents.
 - (10) Contact information to assist an end-user to determine proper ways to dispose of waste generated by the diesel emission control strategy (e.g., ash accumulated in filter-based systems). At a minimum, the owner's manual should indicate that disposal must be in accordance with all applicable Federal, State and local laws governing waste disposal.
- ~~(j)~~ (k) Noise Level Control. Any diesel emission control system that replaces a muffler must continue to provide at a minimum the same level of exhaust noise attenuation as the muffler with which the vehicle was originally equipped by the vehicle or engine manufacturer. Applicants must ensure that the diesel emission control system complies with all applicable noise limits contained in Part 205, Title 40, Code of Federal Regulations and California Vehicle Code, Sections 27150, 27151 and 27200 through 27207, for the gross vehicle weight rating and year of manufacture of the vehicle for which the diesel emission control strategy is intended. All diesel emission control systems must be in compliance with applicable local government requirements for noise control.

~~(k)~~ (l) Multimedia Assessment for Fuel Strategies. Diesel emission control strategies which rely on fuel changes either through use of additives or through use of alternative diesel fuels must undergo an evaluation of the multimedia effects. No diesel emission control strategy that relies on the use of an additive or an alternative fuel may be verified unless a multimedia evaluation of the additive or alternative fuel has been conducted and the California Environmental Policy Council established by Public Resources Code section 71017 has determined that such use will not cause a significant adverse impact on the public health or the environment, pursuant to Health and Safety Code section 43830.8. No person shall sell, offer for sale, supply or offer for supply an alternative fuel or a diesel fuel in California that contains an additive for use in a verified diesel emission control strategy unless such a multimedia evaluation has been conducted and resulted in a determination that use of the alternative fuel or additive will not cause a significant adverse impact on the public health and the environment. The applicant shall bear the expense of conducting the multimedia assessment.

(m) Sales and Installation. No person or entity shall advertise, sell, lease, supply, offer for sale, represent, or install any device, apparatus, mechanism, or fuel based system as a verified diesel emission control strategy for or on any engine, vehicle or equipment that does not meet the terms and conditions of the strategy's Executive Order. The applicant, distributor, and/or installer must ensure that each verified diesel emission control strategy is supplied, sold, leased, and installed pursuant to the provisions of the Executive Order. Failure to follow the provisions of the Executive Order may result in revocation or suspension of the verification and/or any other remedy available under Part 5, Division 26 of the Health and Safety Code.

~~(j)~~ (n) Verification of a diesel emission control strategy by the Air Resources Board does not release the applicant from complying with all other applicable legal requirements.

NOTE: Authority cited: Sections 39002, 39003, 39500, 39600, 39601, 39650-39675, 40000, 43000, 43000.5, 43011, 43013, 43018 and 43105, 43600, 43700, 43830.8, Health and Safety Code. Reference: Sections 39650-39675, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107, 43204-43205.5, and 43830.8 Health and Safety Code; Section 71017 Public Resources Code; Title 17 of Regulations Section 93000.

§ 2708. Determination of Emissions Reduction.

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- (b) Categorization of the Diesel Emission Control Strategy. The Executive Officer shall categorize diesel emission control strategies to reduce PM and NOx emissions based on their verified emission reductions. All diesel emission control strategies must reduce PM by at least 25 percent to receive verification. Diesel emission control strategies that reduce NOx will be assigned their verified emission reduction in five percent increments. Diesel emission control strategies are categorized by their PM reductions as follows:
- (1) Level one: the system has been demonstrated under these procedures to reduce PM emissions by at least 25 percent from the baseline emission level.
 - (2) Level two: the system has been demonstrated under these procedures to reduce PM emissions by at least 50 percent from the baseline emission level.
 - (3) Level three: the system has been demonstrated under these procedures to reduce PM emissions by at least 85 percent from the baseline emission level, or to achieve PM emission levels of 0.01 grams per brake-horsepower-hour (g/bhp-hr) or less.

NOTE: Authority cited: Sections 39002, 39003, 39500, 39600, 39601, 39650-39675, 40000, 43000, 43000.5, 43011, 43013, 43018 and 43105, 43600, 43700, Health and Safety Code. Reference: Sections 39650-39675, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107, and 43204-43205.5 Health and Safety Code; Title 17 California Code of Regulations Section 93000.

§ 2709. In-Use Compliance Requirements

- (a) Applicability. These in-use compliance requirements apply to all diesel emission control strategies for on-road, off-road, and stationary applications. It is the responsibility of the applicant to perform in-use compliance testing for each verified diesel emission control strategy family (see Section 2706~~(g)~~ (h) (2)). Testing is required when 50 units within a given diesel emission control strategy family have been sold or leased in the California market. Applicants must submit an in-use compliance testing proposal for approval by the Executive Officer prior to the in-use compliance testing. Applicants who have sold 50 units or more but have less than 50 units installed may submit a request for the Executive Officer to delay the in-use compliance deadlines specified in this section.
- (b) Test Phases. In-use compliance testing, as described below in ~~(c), (d), and (e)~~ (d), (e), (f), and (g) and performed per an approved in-use compliance testing proposal, must be conducted at two different phases for each diesel emission control strategy family:
- (1) Phase 1. Applicants must obtain and test diesel emission control systems once they have been operated for at least ~~one year or within three months of their first maintenance~~ 25 percent of their minimum warranty period or for one year, whichever comes first.

- (2) Phase 2. Applicants must obtain and test diesel emission control systems once they have been operated between 60 and 80 percent of their minimum warranty period. For all systems used with heavy heavy-duty vehicles, the 60 to 80 percent window must be applied to the 5 year or 150,000 mile minimum warranty period.

(c) In-Use Compliance Testing Proposal. The applicant must submit to the Executive Officer a Phase 1 in-use compliance testing proposal no later than 90 days after selling the 50th unit. The applicant must submit a Phase 2 in-use compliance testing proposal the the Executive Officer no later than 3 years after the 50th unit is sold. The following information must be included in both testing proposals:

- (1) Applicant identification.
- (2) Diesel emission control strategy family name.
- (3) Parties to be involved in conducting in-use compliance tests.
- (4) Test facility identification and description.
- (5) Quality control and quality assurance procedures for the test equipment.
- (6) List of candidate test units (at least 10 choices per phase) with the following information for each: vehicle/equipment information on which the unit is installed (make, model, model year), location, engine information (family name, make, series, model year, displacement), date of manufacture, date of installation, and cleaning/repair history.
- (7) Cumulative sales of the emission control strategy family in each application.
- (8) Predicted mileage or hours of use each diesel emission control system will have accrued by the time it is obtained.
- (9) Description of test vehicles and engines (engine family name, make, model, model year, displacement)
- (10) Testing plan for meeting the requirements of part (g) below.

Within 45 days of receipt of the completed testing proposal, the Executive Officer shall determine whether the applicant has an appropriate testing proposal to support in-use compliance testing. The in-use testing proposal will not be considered approved until the Executive Officer issues the applicant a letter of approval. If the Executive Officer determines that the testing proposal is insufficient or inappropriate, the applicant must, within 30 days, submit a revised testing proposal.

~~(c)~~ (d) Selection of Diesel Emission Control Systems for Testing. For each diesel emission control strategy family and for both test phases, the Executive Officer will identify a representative sample of engines or vehicles equipped with diesel emission control systems for in-use compliance testing. the applicant must propose a representative sample of installed diesel emission control systems for in-use compliance testing based on

information provided per Section 2709(c) to be approved by the Executive Officer. The selected diesel emission control systems should come from a representative sample of engines or vehicles equipped with the control systems. The engines or vehicles equipped with the selected diesel emission control systems must have good maintenance records and may receive a tune-up or normal maintenance prior to testing the applicant obtaining the diesel emission control systems for testing. The applicant must obtain information from the end users regarding the diesel emission control systems' accumulated mileage or hours of usage, maintenance records (to the extent practicable), operating conditions and a description of any unscheduled maintenance that may affect the emission results.

(e) Selection of Test Engines. The Executive Officer must approve the appropriate test engines or vehicles for in-use compliance testing. The applicant must provide candidate test vehicles/engines for the Executive Officer's review. If the Executive Officer determines that a diesel emission control system affects the performance of the engine, the Executive Officer may require the applicant to test the selected diesel emission control system with the engine on which it is installed.

~~(d)~~ (f) Number of Diesel Emission Control Systems to be Tested. The number of diesel emission control systems an applicant must test in each of the two test phases will be determined as follows:

(1) A minimum of four diesel emission control systems in each diesel emission control strategy family must be tested. For every system tested that does not reduce emissions by at least 90 percent of the lower bound of its initial verification level (or does not achieve an emission level less than or equal to 0.011 g/bhp-hr of PM) or does not meet the NO₂ requirement in section 2709(j) (k), two more diesel emission control systems from the same family must be obtained and tested. The total number of systems tested shall not exceed ten per diesel emission control strategy family.

(2) At the discretion of the Executive Officer, applicants may begin by testing more than the minimum of four diesel emission control systems. Applicants may concede failure of an emission control system before testing a total of ten diesel emission control systems.

~~(e)~~ (g) In-use Compliance Emission Testing. Applicants must follow the testing procedure used for emission reduction verification as described in Section 2703 (both baseline and control tests are required). In addition, applicants must select the same test cycle(s) that they used to verify the diesel emission control strategy originally. As provided in Section 2709(h), the applicant may request the Executive Officer to accept an alternative testing procedure. If a diesel emission control strategy verified by U.S. EPA must perform engine dynamometer testing with the Heavy-duty Transient FTP cycle to fulfill the in-use compliance requirements of that

program, but was verified by the Executive Officer with chassis dynamometer testing, the Executive Officer will also accept testing with the Heavy-duty Transient FTP cycle for the in-use compliance requirements of this Procedure. ~~If a diesel emission control strategy fails catastrophically during the in-use compliance testing, the applicant must provide an investigative report detailing the causes of the failure to the Executive Officer within 90 days of the failure.~~

- (f) ~~The Executive Officer may approve an alternative to the in-use testing described above, on a case by case basis, if such testing is overly burdensome to either the applicant or to the end users due to the nature of the industry the particular diesel emission control systems are used in. The proposed alternative must use scientifically sound methodology and be designed to determine whether the diesel emission control strategy is in compliance with the emission reductions the Executive Officer verified it to.~~
- (h) Alternative Test Cycles and Methods. The Executive Officer may consider, on a case by case basis, an alternative test plan or method for applicants to satisfy the in-use compliance requirements of this section. The proposed alternative test plan must be as scientifically sound as the testing required by the Procedure and it must produce accurate results that will unquestionably indicate if the emission control system reduces emissions to the level for which it was verified. Use of an alternative test procedure must be approved by the Executive Officer.
- (g) ~~The Executive Officer may, with respect to any diesel emission control strategy sold, leased, offered for sale, or manufactured for sale in California, order the applicant or strategy manufacturer to make available for compliance testing and/or inspection a reasonable number of diesel emission control systems, and may direct that they be delivered at the applicant's expense to the state board at the Haagen-Smit Laboratory, 9528 Telstar Avenue, El Monte, California or where specified by the Executive Officer. The Executive Officer may also, with respect to any diesel emission control strategy being sold, leased, offered for sale, or manufactured for sale in California, have an applicant compliance test and/or inspect a reasonable number of units at the applicant or manufacturer's facility or at any mutually agreeable test laboratory under the supervision of the ARB Executive Officer.~~
- (h) (i) In-Use Compliance Report. The applicant must submit an in-use compliance report to the Executive Officer ~~within three months of completing each phase of testing~~ after each phase of testing. The applicant must submit the phase 1 report within 18 months from when the 50th unit is sold. The phase 2 report must be submitted within 4 years from when the 50th unit is sold. The following information must be reported for each of the minimum of four diesel emission control systems tested:

- (1) Parties involved in conducting the in-use compliance tests.
- (2) Quality control and quality assurance information for the test equipment.
- (3) Diesel emission control strategy family name and manufacture date.
- (4) Vehicle or equipment and type of engine (engine family name, make, model year, model, displacement, etc.) the diesel emission control system was applied to.
- (5) Mileage or hours the diesel emission control system was in use.
- (6) Results of all emission testing.
- (7) Summary of all maintenance, adjustments, modifications, and repairs performed on the diesel emission control system.

(j) (i) The Executive Officer may request the applicant to perform additional in-use testing if the warranty claims exceed four percent of the number of diesel engines using the diesel emission control strategy, or based on other relevant information. As noted in Section 2707(c), if warranty claims exceed four percent of the number of diesel engines using the diesel emission control strategy, the applicant must notify the Executive Officer and submit a warranty report within 30 calendar days of that time.

(j) (k) Conditions for Passing In-Use Compliance Testing. For a diesel emission control strategy to pass in-use compliance testing, emission test results must indicate that the strategy reduced emissions by at least 90 percent of the lower bound of the emission reduction level the Executive Officer originally verified it to. In addition, the strategy must meet the requirements of section 2706(a) with the exception that the strategy must not increase emissions of NO₂ by more than an increment equivalent in mass to 33 or 22 percent of the baseline NO_x emission level for systems verified under the 30 or 20 percent NO₂ limits, respectively. If the first four diesel emission control systems tested within a diesel emission control strategy family meet both of these standards, the diesel emission control strategy passes in-use compliance testing. If any of the first four diesel emission control systems tested within a diesel emission control strategy family fail to meet either of these standards, and more than four units are tested, at least 70 percent of all units tested must meet both standards for the diesel emission control strategy family to pass in-use compliance testing. For each failed test, for which the cause of failure can be attributed to the product and not to maintenance or other engine-related problems, two additional units must be tested, up to a total of ten units per diesel emission control strategy family. Within 30 days of a test unit failing, the applicant must send a testing proposal for the additional test units that is compliant with part (c) above to the Executive Officer for approval. The testing proposal must include an investigative report detailing the causes of the failure. The Executive Officer shall, within 45 days of its receipt, determine whether the test plan is acceptable. After receiving approval from the Executive Officer, the applicant must complete testing.

~~(k)~~ (l) Failure of In-use Compliance Testing. If a diesel emission control strategy family does not meet the minimum in-use compliance requirements ~~for compliance of this section~~, the applicant must submit a remedial report within 90 days after the in-use compliance report is submitted. The remedial report must include:

- (1) Summary of the in-use compliance report.
- (2) Detailed analysis of the failed diesel emission control systems and possible reasons for failure.
- (3) Remedial measures to correct or replace failed diesel emission control systems as well as the rest of the in-use diesel emission control systems.

~~(l)~~ (m) The Executive Officer may evaluate the remedial report, annual warranty report, and all other relevant information to determine if the diesel emission control strategy family passes in-use compliance testing. The Executive Officer may request ~~more~~ additional information from the applicant. Based on this review, the Executive Officer may lower the verification level or revoke the verification status of a verified diesel emission control strategy family. The Executive Officer may also lower the verification level or revoke the verification status of a verified diesel emission control strategy family, if the applicant does not conduct in-use compliance testing in accordance with this section, or if the Executive Officer conducts in-use compliance testing in accordance with this section (including alternative testing) and the diesel emission control strategy family does not pass the standards in this section.

~~(m)~~ (n) The Executive Officer may lower the verification level or revoke the verification status of a verified diesel emission control strategy family if the applicant fails to observe the requirements of Sections 2706 or 2707. The Executive Officer must allow the applicant an opportunity to address the possible lowering or revocation of the verification level in a remedial report to the Executive Officer and the Executive Officer may make this determination based on all relevant information.

NOTE: Authority cited: Sections 39002, 39003, 39500, 39600, 39601, 39650-39675, 40000, 43000, 43000.5, 43011, 43013, 43018 and 43105, 43600, 43700, Health and Safety Code. Reference: Sections 39650-39675, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107, and 43204-43205.5 Health and Safety Code; Title 17 California Code of Regulations Section 93000.

§ 2710. Verification of Emission Reductions for Alternative Diesel Fuels and Fuel Additives

(a) Applicability. This section applies to in-use strategies that include emission reductions from the use of alternative diesel fuels or fuel additives. The

requirements in this section are in addition to those in Sections 2700-2709, except as specifically noted.

- (b) Alternative Diesel Fuel and Fuel Additive Proposed Test Protocol. The applicant must submit a proposed test protocol which includes:
- (1) References to criteria pollutant and toxic emissions sampling and analyses that are consistent with the requirements of Section 2703.
 - (2) Description and Parameters of Alternative Diesel Fuels and Fuel Additives.
 - (A) The applicant must describe the applicability of the alternative diesel fuel or fuel additive to diesel engines and identify any requirements for engine or fuel system modifications.
 - (B) The applicant must provide a general description of the alternative diesel fuel or fuel additive that includes the fuel type, fuel characteristics, fuel properties, fuel formulation, and chemical composition. The applicant for the candidate alternative diesel fuel or fuel additive must specify the following:
 1. Identity, chemical composition, and concentration of fuel additives
 2. Sulfur content
 3. Total aromatic content
 4. Total polycyclic aromatic hydrocarbon content
 5. Nitrogen content
 6. API gravity (density)
 7. Distillation temperature distribution information, initial boiling point (IBP),
 8. 10% recovered (REC), 50% REC, 90% REC, and end point (EP)
 - (C) The applicant must provide information on the candidate alternative diesel fuel or fuel additive that may affect engine performance, engine wear, and safety. The applicant for the candidate alternative diesel fuel or fuel additive must specify the following:
 1. Viscosity (engine performance)
 2. Fuel volatility (engine performance)
 3. Ignition quality (engine performance)
 4. Fuel operating temperatures (engine performance)
 5. Engine wear tendencies (engine wear)
 6. Corrosion (engine wear)
 7. Lubricity (engine wear)
 8. Fuel flash point (safety)
 - (D) The applicant must provide information on the candidate alternative diesel fuel or fuel additive to determine if there are chemicals in the fuel that may increase levels of toxic compounds or potentially form toxic compounds in the fuel. The applicant will conduct an analysis for metals and elements by a method specified by the applicant. Copper, iron, cerium, lead, cadmium, chromium, and phosphorus must be included in the analysis. Additional analysis for other toxic compounds may be required after reviewing the chemical composition of the

candidate alternative diesel fuel and its additives or fuel additive .

(Note: For alternative diesel fuels or fuel additives that are in part comprised of standard diesel fuel, such as emulsified diesel fuels, a toxic analysis of the diesel base fuel is not necessary).

- (E) With the approval of the Executive Officer or designee, an applicant may also specify different fuel parameters and test methods that are appropriate to better characterize the candidate alternative diesel fuel or fuel additive .
- (3) Upon review of the proposed test protocol, the Executive Officer or designee may require additional fuel components, parameters, and specifications to be determined.
- (4) Reference Fuel Specifications. The reference fuel used in the comparative testing described in Section 2710(d) allows the applicant three options in selecting a reference fuel.
- ~~(4)~~(A) Option (1). The first option is to use a 10 percent aromatic California diesel reference fuel. The reference fuel must be produced from straight-run California diesel fuel by a hydrodearomatization process and must have the characteristics set forth below under "Reference Fuel Specifications" (the listed ASTM methods are incorporated herein by reference).
- (B) Option (2). The second option is to make the reference fuel from a custom blend using a "like" California diesel fuel made from a straight-run California diesel fuel by a hydroaromatization process and must have the characteristics set forth below under "Reference fuel Specifications". In addition the reference fuel must exhibit the bell shaped distillation curve characteristic of diesel fuel and no chemical feedstocks or pure chemicals such as solvents can be used as blend stocks. Details of the source and specifications of the feedstocks must be provided in the protocol and the processes and diesel feedstocks used to make the reference fuel must be reviewed and approved by the Executive Officer.
- (C) Option (3). For alternative diesel fuels and fuel additives that contain diesel as a base fuel such as emulsified diesel fuel and 80:20 biodiesel fuel (80 percent diesel/20 percent biodiesel), the base diesel fuel used to make the alternative diesel fuel or fuel additive can be used in place of the 10 percent aromatic California diesel reference fuel. The base diesel fuel must be a certified, commercially available diesel fuel sold in California. The sulfur content, aromatic hydrocarbon content, polycyclic aromatic hydrocarbon content, nitrogen content, natural cetane number, API gravity, viscosity, and distillation specifications must be provided for the base diesel fuel used for the reference fuel.

Table 6. Fuel Test Methods and Reference Fuel Specifications

Property	General Reference Fuel Specifications	ASTM Test Method
Sulfur Content	500 ppm max	D5453-93
Aromatic Hydrocarbon content, Vol. %	10% max	D5186-96
Polycyclic Aromatic Hydrocarbon content %	1.4% max	D5186-96
Nitrogen Content	10 ppm max	D4629-96
Natural Cetane Number	48 min	D613-84
Gravity, API	33-39	D287-82
Viscosity at 40°, cSt	2.0-4.1	D445-83
Flash point, °F	130	D93-80
Distillation, °F		D86-96
IBP	340-420	
10%REC	400-490	
50%REC	470-560	
90%REC	550-610	
EP	580-660	

- (5) The identity of the entity proposed to conduct the tests described in Section 2710(d);
 - (6) Reasonably adequate quality assurance and quality control procedures;
 - (7) Notification of any outlier identification and exclusion procedure that will be used, and
 - (8) A demonstration that any procedure meets generally accepted statistical principles.
- (c) Application for Alternative Diesel Fuel and Fuel Additive Emission Reduction Verification. Upon completion of the tests, the applicant may submit an application for verification to the Executive Officer or designee. The application must follow the format in Section 2702(d) as applicable and include:
- (1) The approved test protocol,
 - (2) All of the test data,
 - (3) Copy of the complete test log prepared in accordance with Section 2710(d)(3)(B),
 - (4) A demonstration that the candidate alternative diesel fuel or fuel additive meets the requirements for verification set forth in this section, and
 - (5) Such other information as the Executive Officer or designee may reasonably require.
- (d) Emissions Test Procedures for Particulates, Nitrogen Oxides, Soluble Organic Fraction, Hydrocarbons, and Toxics.
- (1) Criteria pollutants test requirements. In each test of a fuel, exhaust emissions of NO_x, NO₂ (pursuant to Section 2706(a)(2)), total PM, carbon

monoxide, carbon dioxide, and hydrocarbons must be measured. In addition, for each test the soluble organic fraction (SOF) of the particulate matter in the exhaust emissions must be determined in accordance with the Air Resources Board's "Test Method for Soluble Organic Fraction (SOF) Extraction" dated April 1989, which is incorporated herein by reference.

- (2) Toxic emissions sampling and analysis requirements. Exhaust emissions of formaldehyde, acetaldehyde, benzene, toluene, ethyl benzene, xylenes, butadiene, and polycyclic aromatic hydrocarbons are to be sampled and analyzed as specified in Table 7 for a minimum of three test samples collected from separate emission test repetitions.

Table 7. Toxics sampling and analysis ^{1,2}

Toxics	Method
Formaldehyde and acetaldehyde	ARB SOP 104
Benzene toluene, ethyl benzene, xylenes, and butadiene	ARB SOP 102/103
Polycyclic aromatic hydrocarbons	ARB method 429 ³

¹Additional toxics sampling may be required depending on the chemical composition of the additives in the fuel.

²At a minimum tunnel blanks are required prior to and after conducting toxic emissions sampling for the reference fuel and candidate alternative diesel fuel or fuel additive.

³PAH sampling consists of a filter to collect particulate PAHs and XAD resin to collect volatile PAHs. The sampling protocol needs to be included in the test protocol. Analysis of the samples will be performed by ARB method 429.

- (3) Emission test requirements and test sequence for emissions test program.

(A) The applicant must follow the emission test requirements from Section 2703 subsections (a), (b), (k), (l), (m), ~~and (n)~~. For all on-road, ~~off-road, and stationary~~ diesel vehicles and equipment, the applicant must conduct engine dynamometer testing using the Federal Test Procedure (FTP) Heavy-duty Transient Cycle, in accordance with the provisions in the Code of Federal Regulations, Title 40, Part 86, Subpart N. For all off-road and stationary diesel vehicles and equipment, the applicant must conduct engine dynamometer testing in accordance with Section 2703(e)(2) and 2703(e)(3). The applicant must use one of the following test sequences:

1. If both cold start and hot start exhaust emission tests are conducted, a minimum of five exhaust emission tests must be performed on the engine with each fuel, using either of the following sequences, where "R" is the reference fuel and "C" is the candidate

alternative diesel fuel or fuel additive : RC CR RC CR RC (and continuing in the same order) or RC RC RC RC RC (and continuing in the same order). The engine mapping procedures and a conditioning transient cycle must be conducted with the reference fuel before each cold start procedure using the reference fuel. The reference cycle used for the candidate alternative diesel fuel or fuel additive must be the same as determined for the reference fuel.

2. If only hot start exhaust emission tests are conducted, one of the following test sequences must be used throughout the testing, where "R" is the reference fuel and "C" is the candidate alternative diesel fuel or fuel additive :

Alternative 1: RC CR RC CR (continuing in the same order for a given calendar day; a minimum of twenty individual exhaust emission tests must be completed with each fuel)

Alternative 2: RR CC RR CC (continuing in the same order for a given calendar day; a minimum of twenty individual exhaust emission tests must be completed with each fuel)

Alternative 3: RRR CCC RRR CCC (continuing in the same order for a given calendar day: a minimum of twenty-one individual exhaust emission tests must be completed with each fuel)

For all alternatives, an equal number of tests must be conducted using the reference fuel and the candidate alternative diesel fuel or fuel additive on any given calendar day. At the beginning of each calendar day, the sequence of testing must begin with the fuel that was tested at the end of the preceding day. The engine mapping procedures and a conditioning transient cycle must be conducted at the beginning of each day for the reference fuel. The reference cycle used for the candidate alternative diesel fuel or fuel additive must be the same as determined for the reference fuel.

3. Alternative test sequence. The applicant may request the Executive Officer to approve an alternative test sequence in place of the above test sequences. In reviewing this request, the Executive Officer may consider all relevant information including, but not limited to, the following:
 - (i-) a. Statistical and scientific equivalence to 1. or 2., and
 - (ii-) b. Body of existing test data using the alternative test sequence.
- (B) The applicant must submit a test schedule to the Executive Officer or designee at least one week prior to commencement of the tests. The test schedule must identify the days on which the tests will be conducted, and must provide for conducting test consecutively without substantial interruptions other than those resulting from the normal

hours of operations at the test facility. The Executive Officer or designee should be permitted to observe any tests. The party conducting the tests must maintain a test log which identifies all tests conducted, all engine mapping procedures, all physical modifications to or operational tests of the engine, all recalibrations or other changes to the test instruments, and all interruptions between tests, and the reason for each interruption. The party conducting the tests or the applicant must notify the Executive Officer or designee by telephone and in writing of any unscheduled interruption resulting in a test delay of 48 hours or more, and the reason for such delay. Prior to restarting the test, the applicant or person conducting the tests must provide the Executive Officer or designee with a revised schedule for the remaining tests. All tests conducted in accordance with the test schedule, other than any test rejected in accordance with an outlier identification and exclusion procedure included in the approved test protocol, must be included in the comparison of emissions.

- (C) Upon approval of the Executive Officer or designee, the applicant may specify an alternative test sequence to Section 2710(d)(3)(A). The applicant must provide the rationale demonstrating that the alternative test sequence better characterizes the average emissions difference between the reference fuel and the alternative diesel fuel or fuel additive .

(e) Durability.

- (1) The applicant must meet the durability demonstration requirements in Section 2704 subsections (a), (b), (d), (e), and (h) with the exceptions of emission testing and fuel requirements. If the applicant's diesel emission control strategy includes hardware components in addition to the alternative diesel fuel or fuel additive, then the emission testing requirements in Section 2704 apply.
- (2) The applicant must provide test data obtained after completion of the service accumulation, described in Section 2704(d), showing that the candidate alternative diesel fuel or fuel additive does not adversely affect the performance and operation of diesel engines or cause premature wear or cause damage to diesel engines. This must include but is not limited to lubricity, corrosion, and damage to engine parts such as fuel injector tips. The applicant must provide data showing under what temperature and conditions the candidate alternative diesel fuel or fuel additive remains stable and usable in California.

- (f) Multimedia Assessment for Fuel Strategies. Diesel emission control strategies which rely on fuel changes either through use of additives or through use of alternative diesel fuels must undergo an evaluation of the multimedia effects. No diesel emission control strategy that relies on the use of an additive or an alternative fuel may be verified unless a multimedia evaluation of the additive or alternative fuel has been conducted and the California Environmental

Policy Council established by Public Resources Code section 71017 has determined that such use will not cause a significant adverse impact on the public health or the environment, pursuant to Health and Safety Code section 43830.8. No person shall sell, offer for sale, supply or offer for supply an alternative fuel or a diesel fuel in California that contains an additive for use in a verified diesel emission control strategy unless such a multimedia evaluation has been conducted and resulted in a determination that use of the alternative fuel or additive will not cause a significant adverse impact on the public health and the environment. The applicant shall bear the expense of conducting the multimedia assessment.

(g) Other Requirements.

(1) The candidate alternative diesel fuel or fuel additive must be in compliance with applicable federal, state, and local government requirements.

(2) Applicants planning to market fuel in California must contact and register with the U.S. EPA and the California Dept. of Food and Agriculture. Contacts are listed below.

Office of Transportation and Air Quality

U.S. EPA Head Quarters

Ariel Rios Blvd.

1200 Pennsylvania Ave, N.W.

Washington DC 20468

Phone (202) 564-9303

Petroleum Products/Weighmaster Enforcement Branch

Division of Measurement Standards

Dept. of Food and Agriculture

8500 Fruitridge Road, Sacramento CA 95826

Phone (916) 229-3000

(3) Additional government agencies such as the California Energy Commission, Area Council of Governments, and Local Air Quality Management Districts may be contacted to facilitate the marketing of alternative diesel fuel in California.

(h) Conditional Verification.

(1) The Executive Officer may grant a conditional verification for an alternative diesel fuel or fuel additive for off-road or stationary applications only after the conditional verification for on-road application is granted. The Executive Officer may grant a conditional verification for on-road application if the applicant meets the following conditions:

(A) The applicant has applied for U.S. EPA registration of the alternative diesel fuel or fuel additive ;

(B) The U.S. EPA has granted a research and development exemption or otherwise granted permission for the alternative diesel fuel or fuel additive to be used, and;

- (C) All relevant requirements of Sections 2700-2710 have been met with the exception that registration with the U.S. EPA has not been completed.
- (D) Multimedia Assessment as specified in Section 2710 (f).
- (2) Where conditional verification is granted, full verification must be obtained by completing the U.S. EPA registration process within a year after receiving conditional verification. During that year, conditional verification is equivalent to verification for the purposes of satisfying the requirements of in-use emission control regulations.
- (i) Extensions of an Existing Verification. See Section 2702 (g). The applicant may request the Executive Officer to approve a reduced number of emission tests when extending an existing verification to other emission control groups. In reviewing this request, the Executive Officer may consider all relevant information including, but not limited to, the following:
 - (1) Variability in the test results used for the existing verification,
 - (2) Characteristics of the duty cycles in the other emission control groups,
 - (3) The mechanism by which the alternative diesel fuel or fuel additive reduces emissions, and
 - (4) Body of existing test data.

NOTE: Authority cited: Sections 39002, 39003, 39500, 39600, 39601, 39650-39675, 40000, 43000, 43000.5, 43011, 43013, 43018 and 43105, 43600, 43700, 43830.8 Health and Safety Code. Reference: Sections 39650-39675, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107, 43204-43205.5, and 43830.8 Health and Safety Code; Section 71017 Public Resources Code, Title 17 California Code of Regulations Section 93000.